

PATENT APPLICATION

AN ELECTRONIC-RECEIPTS SERVICE

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AN ELECTRONIC-RECEIPTS SERVICE

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This application claims the benefit of the filing date(s) of the following earlier application(s):

U.S. Patent Application No. 60/137,575, entitled, "A Web-Enabled Point-
of-Sale Device," filed June 4, 1999, naming Scott T. Allan, Timothy L. Droz, Alexander F.
Fraikor, Jeffrey T. Miles and J. G. Stout as inventors, with Attorney Docket No.
P-68133/TOH/LM, and commonly assigned to @POS.COM of San Jose, California
(formerly PenWare, Inc. of Sunnyvale, California); and

U.S. Patent Application No. 60/141,380, entitled, "An Electronic-Receipts Service," filed June 28, 1999, naming Llavanya Fernando and Aziz Valliani as joint inventors, with Attorney Docket No. P-68207/TOH/LM, and commonly assigned to @POS.COM of San Jose, California.

This application is a continuation-in-part of:

25 U.S. Patent Application No. 08/957,757, entitled, “Method and System for Automated Electronic Receipt of Transactions,” filed October 24, 1997, naming Aziz Valliani, Abbas Rafii and Nazim Kareemi as joint inventors, with Attorney Docket No. A-65188/TOH/MAK/LM, and commonly assigned to @POS.COM (formerly PenWare, Inc. of Sunnyvale, California), itself a continuation in part of U.S. Patent No. 08/853,955,
30 entitled, “Modular Signature and Data-Capture System and Point of Transaction Payment and Reward System,” filed May 9, 1997, naming Aziz Valliani, Abbas Rafii and Nazim Kareemi as inventors, with Attorney Docket No. A-63562/TOH, and commonly assigned

to @POS.COM of San Jose, California.

U.S. Patent Applications No. 60/137,575, 60/141,380, 08/957,757 and 08/853,955 are incorporated by reference herein.

5

BACKGROUND

This invention relates to electronic commerce. More specifically, this invention relates to transaction-records depositories for electronic-data warehousing and retrieval and the availability of these depositories and electronic receipts over the web.

10

Successful world-wide-web ("web") portals appeal to advertisers and other marketers. Such portals provide an advertiser access to large numbers of potential customers targeted according to their buying or browsing interests. For that access, an advertiser will readily pay a web-portal provider.

15

For the provider of a web portal, the problem becomes one of achieving a scale that provides a potential advertiser with an adequate number of consumer viewers such that the advertiser would pay for access to them.

20

Turning to a different art, it is believed that worldwide point-of-sale (POS) locations number about seventeen million, eight million of which are in the United States. Retail POS sites account for two million of these locations, and the remaining six million are located in hotels, health clubs, hospitals, commercial banks, health-care providers, insurance agencies, etc.

25

Electronic cash registers, no-frills card-swipe electronic-funds-transfer units and signature-capture platforms dominate these U.S. POS locations. A consumer pays presenting cash, a check, a debit or credit card, an electronic-funds transfer card (automated-teller-machine card) or a smart card. The genesis of prior-art cash registers was, of course, the receipt of currency. The register evolved to generate a paper transaction receipt and, still later, to accept and perform the initial processing of paper checks. With the introduction of debit and credit cards, cash registers evolved still further to incorporate card readers. The card readers are integral to the main body of the cash register or are distally located closer to the customer as compared to the register operator but nonetheless connected directly to the cash register. (In the latter distally located incarnations, these card readers are termed "stand besides.") Finally, registers today incorporate signature

capture mechanisms to facilitate debit and credit card transactions.

With the introduction of payment by electronic fund transfer, cash registers sprouted stand besides that incorporated not only card readers for debit, credit and EFT cards but also keypads for entry of validating personal identification numbers (PINs).

5 On a somewhat orthogonal track, the cash registers evolved from paper-receipt generators without any display to their current state: still paper-receipt generators but with simultaneous readout of a (somewhat brief) description of the one item currently being priced along with the price of the item. The stand-beside with the card reader and keypad also includes a small (typically two-line) alphanumeric liquid crystal display (LCD)
10 presenting transaction totals, labels for keys on the keypad and minimal instructions to the consumer on how to proceed.

Estimates of the time a consumer typically spends at various points-of-sale (POS) platforms range from 30 seconds at convenience stores to 3.5 minutes at supermarkets. Averaging across POS platforms, the consumer spends 1.7 minutes at a
15 POS. Assuming an average of 30 visits per day for the typical POS, these visits represent 240 million individuals per day captured at POS platforms for 1.7 minutes each time in the U.S. alone.

Accordingly, it is desirable to aggregate POS sites to achieve a scale of consumer viewers such that providing content to the aggregate POS sites becomes
20 economically desirable.

Assuming a 10-second impression and an average cost-per-thousand-impressions (CPM) rate of \$25, the U.S. POS platforms alone represent 2.4 billion impressions in one day, for a value of nearly \$22 billion annually.

It is desirable to leverage the installed base of POS devices and enable them
25 with graphic abilities to permit advertising at a POS location, leveraging a captive audience that is in a "spending mode."

Indeed, it is desirable to further leverage the near ubiquity of POS devices by enabling them to present web-based information (including advertising, surveys and promotions) to the customer and to use web technologies.

30

A portal provider seeking to operate in a retail environment faces the barrier of the installed base of traditional, non-web-enabled POS payment platforms.

Merchants are familiar with their traditional platforms and not overly willing to discard the capital investment that they represent. Many large retailers operate in legacy environments with limited technical functionality in their networks and computers. These limitations include older electronic cash registers with limited memory and proprietary operating systems, as well as legacy software and limited-bandwidth in-store networks.

It is therefore desirable to extend the life of traditional POS platforms to incorporate web technologies and advanced POS-device capabilities. (This includes placing the web-enabled POS device as a stand beside with limited connection to the non-web-enabled POS payment platform. The web-based data center associates the stand beside and the traditional POS platform (through the merchant data center).)

Once such advanced capability is signature capture. Advances in signature-capture platforms have made such platforms popular in the industry. However, integrating electronic-signature capture and storage into legacy systems can be both complex and costly.

It is therefore desirable to extend the life of traditional POS platforms by getting them to cooperate with stand besides that incorporate web technologies and advanced POS-device capabilities.

Nearly catholic in merchant-consumer interactions, particularly face-to-face transactions, is the generation of a receipt to summarize and memorialize a transaction. Even where the transaction has otherwise been completely electronic (the purchase of an e-ticket on an airline's internet web site, for example) and even where the business has otherwise automated its operations, the generation of a receipt is necessary for many reasons. Receipts facilitate exchanges, returns and the resolution of disputed charges, for example.

With receipts generated for the vast majority of transactions, the presence of so many receipts may be counterproductive. The costs to process, store and retrieve these receipts in a timely manner can force a merchant to adopt policies under which it accepts losses rather than disputes a charge or return.

For example, when a customer disputes a credit transaction with his bank, the bank submits a formal transaction-dispute record on paper to the subject merchant. At some appreciably later time, the merchant then faxes to the bank a copy of the paper

transaction receipt that the merchant maintains. The delay can frustrate the customer, and the on-again, off-again nature of the transaction investigation is inefficient for the bank.

Accordingly, it is desirable to achieve both of the seemingly conflicting goals of reducing customer-service costs, on the one hand, and improving the quality of service to the consumer, on the other hand.

It is desirable to severely reduce or even eliminate altogether the costs associated with paper receipts (including labor, storage, retrieval, transaction disputes and charge back) while nonetheless providing relatively immediate access to the information contained on such paper receipts.

The POS payment terminal model 3100, available from the assignee of the instant application, is an example of a prior-art POS device.

Nichtberger et al., U.S. Re-Issue 34,915 (1995) teaches an electronic display of coupons valid for use in a particular store presented to customers in that store. The display presents coupons after the customer inserts a card into the unit. The customer then selects the coupons he hopes to redeem and then proceeds to shop.

The Nichtberger et al. system records the selection and makes information identifying the customer and the selected coupons available to each of the checkout stations in the system. A receipt identifying the selected coupons may be printed for the customer's convenience.

After the customer has made his purchases, he presents his card to the attendant at the checkout station. A card reader reads the card. The Nichtberger et al. system automatically credits the customer for the previously selected coupons that correspond to actual purchases against which the coupons are to be applied.

Thereafter, information regarding the redeemed coupon is transmitted to an operations center that then automatically debits the manufacturer who distributed the coupons and credits the supermarket (corresponding to the checkout station) where the coupon was redeemed. (The operations center also enables the initial presentation of video images of the coupons.)

The use of a personal computer (typically an "IBM-compatible personal computer" or PC) as a POS device is known. However, the amount of space available at a POS site is limited and a PC tends to be too big for the available space. Also, a PC

customized for POS activities can be costly.

It is desirable, therefore, to better use the limited valuable retail space with POS devices with smaller footprints.

It is desirable to eliminate the expensive magnetic pens used by competitors.

5

These and other goals of the invention will be readily apparent to one of skill in the art on reading the background above and the description below.

SUMMARY

10 Herein are described apparatus and methods for a web-based transaction data storage and retrieval offering for merchants and customers. The service provides retailers the operational cost savings of electronic signature capture with minimal integration of such signatures into their legacy systems. Transaction data including signatures are securely transmitted from the merchant to the remote, transaction-record
15 repository. An internet browser then accesses an electronic-records-service web-site that provides a straightforward, user-friendly interface (for searching transaction-record data) for recreating receipts as proof of a transaction.

 When a transaction record (a receipt, for example) is required, the customer, the merchant's employees or designated financial agents of the customer or the merchant
20 (banks or payment processors, for example) access the electronics-records service through an internet using a web browser. These records may be viewed, downloaded, printed, faxed, e-mailed or otherwise transmitted to the desired recipient.

 To access an electronic record, the user visits the electronic-records website, logs in and selects the transaction for which he wishes to view a receipt. The user may
25 search using multiple criteria (date, store location, total transaction amount, for example) and may view an image of the receipt. The user may use the retrieved transaction record to dispute a charge or to return or exchange a good.

 The electronic-records service thus provides a rapid and cost-effective means to serve customers while simultaneously improving the quality of that customer
30 service.

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BRIEF DESCRIPTION OF THE DRAWINGS

Figure #_1 is a diagram illustrating an electronic transaction system #_100 incorporating one embodiment of the invention.

5 **Figures #_2, #_3 and #_4** illustrate several embodiments of the transaction computer (TC) portion of a web-enabled interactive point-of-sale (iPOS) device.

Figure #_5 is a block diagram illustrating the subsystems of a generalized transaction computer in a POS system.

10 **Figure #_6** is a block diagram illustrating an electronic-transaction system that is an expansion of the electronic-transaction system of **Figure #_1**.

Figure #_7 illustrates the hierarchy and relative breadth of control of roles.

Figure #_8 illustrates the point at which the log is updated in the sequence from searching for transaction details to receiving the same.

15 **Figures #_9 and #_10** show trees of web pages for the electronic-receipts service according to one embodiment. **Figure #_9** shows the web pages accessible from the home page of the service.

Figure #_10 shows the web pages accessible from the server of the electronics-receipts service.

20 **Figures WP1 - WP30** are example web pages for the electronic-receipts service, particularly from the viewpoint of a user of the service.

Figures A1 - A3 show the relationship of web pages of **Figures WP1 - WP16** and **WP20 - WP28** to each other.

DESCRIPTION OF SPECIFIC EMBODIMENTS

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ABBREVIATIONS

Following are abbreviations which may appear in this description, along with their expanded meaning:

- eReceipts, electronic receipts.
- POS, point of sale.
- SIV, secure internet vault.
- TC, transaction computer.

TUID, transaction-unique identifiers.

DEFINITIONS

- Administrator: A manager of group users and users in sites.
- 5 Administrator manager: A merchant employee responsible for a site group. An administrator manager may manage administrators, users and sites.
- Batch: See “offline.”
- Field map: See “mapping.”
- 10 Group guest: A user that can search and see information from all sites in a group.
- Group user: See “group guest.”
- Guest: A user that can see information from one site. “Guest” and “group user” are used interchangeably.
- 15 Mapping: The use of generic fields in the data-farm database, which fields are available for a site to use. For example, only Federated uses “STT” to identify a transaction. The service does not store “STT” as a field but rather gives Federated a generic field and allows the merchant to refer to it with the store-specific name.
- 20 Merchant: The store or location entity storing transactional information in electronic receipts. The user usually is located at a merchant or merchant headquarters site.
- Offline: The store-and-forward model of transferring information to and/or from the Web host.
- 25 Row: A dictionary of strings. In one embodiment, the row is the foundation of information transfer for eReceipts objects.
- Search service: The visual and interactive part of the data farm, which part executes on a web server and browser.
- Service administrator: The data-farm person responsible for administrating data-farm internal data (for example, site groups, administrator-managers).
- 30 Site: A specific store within a site group, q.v. For example, Macy’s store #182.

Site group:	The group of sites that compose a merchant's stores. Sometimes a client but usually a merchant.
Storage service:	The part of the data farm that stores transactional and consumer information in the databases.
5 Table:	A dictionary of rows.
Transaction keys:	The keys in a transaction that make the record unique from all others. In one embodiment of the data farm, the transaction keys are the TUIDs. Each consumer has his own transaction key (which the data farm refers to internally as the transaction
10 indexes).	
User:	The individual accessing the electronic-receipts service through a web browser.

OVERVIEW

15 **Figure #_1** is a diagram illustrating an electronic transaction system #_100 incorporating one embodiment of the invention. The system #_100 includes one or more merchants #_120, optional, intermediate data center(s) #_130, a central data farm #_140 and a personal computer #_190. The system #_100 also includes communications links #_160, #_170 and an internet #_180.

20 Each merchant #_120 and some or all of the optional intermediate partner data center(s) #_130 communicate over the communications link #_160, typically a private network. The optional intermediate partner data center(s) #_130 communicate(s) with the data farm #_140 using the communications link #_170, also typically a private network. (Where no intermediate data center #_130 is present, the merchant(s) #_120 and the data

25 farm #_140 communicate directly using the then-unitary communications links #_160, #_170.)

In addition to communicating using the private networks #_160, #_170, the merchant(s) #_120, any optional intermediate data center(s) #_130 and the data farm #_140 are each communicatively connected as hosts on the internet #_180, allowing any one to

30 communicate with any other one through that internet #_180. (The personal computer #_190 is viewed as a host on the internet #_180, although its actual status is more likely to depend on the directness of its connection to that internet #_180, for example, through

optional service providers not shown.)

A merchant #_120 includes a merchant data center #_127 and one or more point-of-sale (POS) systems #_126. A POS system #_126 and the merchant data center #_127 communicate over a communications link #_128 (typically a serial link) or a communications link #_122. In addition to communicating using the link(s) #_128, #_122, the POS system #_126 is communicatively connected as a host on the internet #_180, allowing communication with any other host on the internet #_180.

In one embodiment, the POS system #_126 includes a portion #_1262 that is typically a non-web-enabled cash register (although the portion #_1262 may be web-enabled). An optionally web-enabled portion #_1261 is herein termed the “transaction computer.” A communications link #_1263 may communicatively couple the portions #_1261, #_1262. The web-enabled transaction computer #_1261 connects the POS system #_126 to the internet #_180.

The POS system #_126 may integrate the typically non-web-enabled (“cash-register”) and web-enabled portions #_1262, #_1261 of the POS payment platform, may maintain them distinct from but directly connected to each other or may only associate the non-web-enabled and web-enabled portions #_1262, #_1261 of the POS platform (i.e., indirectly connect the cash-register and interactive web-enabled portions #_1262, #_1261 of the payment platform.) Alternatively, the POS system #_126 may omit the non-web-enabled portion #_1262 of the POS platform altogether, as would typically be the case with small merchants #_120.

An alternative embodiment of the POS system #_126 is as a web server where consumers can purchase products.

A walk-through of a typical transaction illustrates the system #_100 in situ: A customer of a merchant #_120 enters the merchant #_120’s POS location or web site having the POS system #_126. The customer wishes to purchase a selection of the merchant #_120's goods.

The customer presents to the merchant #_120’s sales agent the selected goods. The sales agent identifies each each of the selected items, by scanning each past a bar-code scanner (not shown) in the POS system #_126, for example. (The currently popular form of marking items for subsequent scanning for purchase is by Uniform Product Code (UPC). The use of UPC is well known in the art and is, therefore, not

described herein.) Say, the customer is buying a personal portable Walkman (tm)-type stereo, inter alia.

With each item identified, the POS system #_126 and the merchant data center #_127 communicate. The result of the communications is that the customer is
5 shown a description of the item last identified, its price, a running total of items identified for purchase so far, a running tax amount, etc. These descriptions may display on the transaction computer #_126.

The POS system #_126 also communicates with the data farm #_140 as the items are identified. The result of the communications is that the customer is presented
10 with content that the data center #_140 determines is appropriate for the customer buying the identified items. Because the customer is expected to be at the POS system #_126 about 90 seconds, the data center #_140 instructs the POS system #_126 to display a multiplicity of distinct contents. For example, the customer may see an instantly redeemable coupon for the personal portable stereo that he is currently purchasing. He may
15 see a coupon for the type of batteries that power the portable stereo he is purchasing. He may see a survey from the merchant #_120 regarding service at the merchant #_120's store (or web site) or from a manufacturer #_130 regarding consumer electronics. He may see an interactive advertisement.

In a batch system #_100, items are identified and stored in the merchant data
20 center #_127 and bulk (batch) data is communicated to the data farm #_140 at predetermined times.

Each transmitted content encourages the customer to attend to and, as appropriate, to indicate consent to its proposition. For the case of the instantly redeemable coupon, the content encourages the customer to select the coupon by touching an area of
25 the screen of the POS system #_126 or clicking on an area of a web page, for example.

Any response to a content is communicated to the data farm #_140. The farm #_140 may alter the current or any subsequent presentation of content to conform with the response it received. (The lack of a response, which is of itself useful information, may or may not be explicitly communicated to the data farm #_140.) Additionally or
30 alternatively, the interactive portion #_1261 may be so responsive.

At some point in the transaction, usually after the sales agent has identified all of the items that the customer selected and the POS system #_126 has displayed the

transaction summary, including a total, the customer presents a form of payment. Where the payment is a credit card, the customer swipes the card through the POS system #_126 and signs electronically, allowing the POS system #_126 to capture his signature. The POS system #_126 forwards the transaction data and captured electronic signature to any of the
5 merchant data center #_120, the optional partner data centers #_130 and the data farm #_140, directly or through forwarding.

Where the customer presents an electronic-funds-transfer card for payment, he swipes the card through the POS system #_126 and enters his validating PIN number.

After the form of payment has been accepted, the POS system may ask the
10 customer whether he would like a printed receipt, informing the customer that the merchant #_120 will maintain an electronic, non-paper receipt available to the customer at all times (should the customer desire this availability), regardless of the customer's preference for a printed receipt.

On completion of the transaction, the POS system #_126 forwards to the
15 data center #_140 such additional information as necessary to allow the data center #_140 to reconstruct the transaction from its records. (This may happen immediately or later in batch processing.) The data center #_140 thus may store data from multiple merchants #_120.

Later, the consumer may visit a website to access this receipt for initiating a
20 charge dispute, downloading into a personal finance application, returning an item, reporting taxes, etc. The merchant #_120 can also visit a web site to view the receipt.

Where the merchant #_120 is a service provider rather than a purveyor of goods, a typical transaction may instead proceed as follows: An estates-and-trusts law firm #_120 completes a will for a client. The client executes the will, signing electronically.
25 The will (including the signature) is transmitted to the data farm #_140 for storage and for viewing using the client's personal computer #_190.

Identification of the customer may occur early in the transaction. This early identification may help target the contents for display to the identified customer.

DEVICES

- Web-Enabled Interactive Point-of-Sale Device

Figures #_2, #_3 and #_4 illustrate several embodiments of the transaction computer (TC) #_1261 of a web-enabled interactive POS system #_126.

Figure #_2 is an illustration of a TC #_200 of a POS system #_126 according to one embodiment of the invention. The TC #_200 includes a screen #_210, a display #_220, a touch screen #_230 and electronic-signature-capture system #_240, a card reader #_250, a CPU #_260, memory #_270, a pen #_2A0 and a stand #_290.

The display #_220 may be a full or partial VGA, SVGA or XGA display, in some embodiments one-quarter VGA. The display #_220 may be monochromatic, limited color or full color, but preferably the last.

The touch system (including the touch screen #_230 and its supporting hardware and software) translates contact with the screen #_210 into coordinates in the display #_220.

The electronic signature-capture system is explained more fully in U.S. Patent Application No. 08/853,955, incorporated by reference herein.

Figure #_5 is a block diagram illustrating the subsystems of a generalized transaction computer #_200 or #_300 in a POS system #_126. The TC #_200, #_300 includes a processor subsystem #_510, a security subsystem #_520, an input subsystem #_530, an output subsystem #_540, a payment subsystem #_550, a communications subsystem #_560 and a bus #_570. The bus #_570 communicatively couples all of the security, input, output, payment and communications subsystems #_520, #_530, #_540, #_550, #_560 to each other and to the processor subsystem #_510.

The processor subsystem #_510 includes a CPU #_511, a memory #_512 and a bus #_513. The memory #_512 includes random-access memory (RAM) #_5122 and an optional flash memory #_5121. The bus #_513 communicatively couples the CPU #_511 and the memory #_512 and may be wholly or partly integral with the bus #_570.

The memory #_512 includes software (not shown) as follows: a web-directed language processor, a protocols stack separate from or integral with the language processor, an input/output subsystem capable of driving ports in the communications subsystem #_560 and other drivers as necessary to operate the input, output, payment and

security subsystems #_530, #_540, #_550, #_560. Hyper-Text Markup Language (HTML) and Java (available from Sun Microsystems of Mountain View, CA) are the web-directed languages currently enjoying the most popularity, while the HyperText Transmission Protocol (HTTP), Transmission and Control Protocol (TCP) and Internet Protocol (IP) are currently the most popular protocols. Extensible Markup Language (XML) and Secure Socket Layers (SSL) are examples of other applicable, popular protocols.

The memory #_512 may also include application software (not shown) for processing data from the input subsystem #_530. For example, certain application software can convert an electronic signature that the subsystem #_530 captured into its equivalent ASCII character sequence.

The input subsystem #_530 may include a keypad (not shown), a touch screen #_531, a keyboard (not shown) and a voice-recognition system (not shown).

The output subsystem #_540 may include a display #_541 that is preferably a color liquid crystal display (LCD), a sound system #_542 that is preferably a speaker and a bus #_543. The bus #_543 communicatively couples the display #_541 and the sound system #_542 to the bus #_570 and may be wholly or partly integral with the bus #_570.

The payment subsystem #_550 may include a magnetic-strip reader #_551, a smart-card processor #_552 and a bus #_553. The bus #_553 communicatively couples the magnetic-strip reader #_551, the smart-card processor #_552 and the bus #_570. The bus #_553 may be wholly or partly integral with the bus #_570. (In one embodiment, the input system can also handle the other types of payment mentioned herein.)

The communications subsystem #_560 includes a serial port #_564 that is preferably an RS-232 or RS-485 port, an auxiliary port #_563 that is preferably an RS-232 port, a parallel port #_562 (preferably a Universal Serial Bus (USB) port), a high-speed communications port #_561 and a bus #_565. The bus #_565 communicatively couples the ports #_564, #_563, #_562, #_561 to the bus #_570. In some embodiments, the bus #_565 is wholly or partly integral with the bus #_570.

In some embodiments, the TC #_200 includes or supports at least one of the following peripherals (not shown): a check reader, a printer, a scanner and a system for electronically capturing biogenic content such as fingerprints or retinal images.

The touch pad #_230, #_531 typically underlies the display #_541, although it need not be co-extensive with the display #_541. Where, for example, the display #_541

is full VGA or XGA and the touch pad #_230, #_531 is only one-quarter so, that portion of the display #_541 over the touch pad #_230, #_531 may be reserved for touch-pad activities such as electronic-signature capture on an HTML page not otherwise requiring touch-pad support.

5 **Figure #_4** is an illustration of a TC #_400 according to one embodiment of the invention.

- An Electronic-Transaction System

10 **Figure #_6** is a block diagram illustrating an electronic-transaction system #_600 that expands on the electronic-transaction system #_100 of **Figure #_1**. The system #_600 includes a merchant #_120 and a web-enabled data farm #_140. The system #_600 also includes communications links #_160/#_170 and an internet #_180.

15 A brick-and-mortar merchant #_120 includes an interactive POS system #_126 (here elided to its constituent TC #_1261), a dumb host #_121, a smart host #_122, a store controller #_123 and a corporate server #_124, as well as a communications link #_128. Each of the POS system #_126, smart host #_122, store controller #_123 and corporate server #_124 includes a software agent with sufficient intelligence to communicate with the data farm #_140.

20 A web-based merchant #_120 includes a POS system/server #_126/#_124. The POS system/server #_126/#_124 includes a software agent with sufficient intelligence to communicate with the data farm #_140.

 The merchant #_120 and the data farm #_140 communicate directly using the communications links #_160/#_170.

25 - The Data Farm

 The data farm #_140 maintains a database #_141 of one or more of the following and similar documents: transaction records, legal documents, banking records, credit-card records, bills, photographs, consumer data and billing information. The transaction records include receipts useable for tax, warranty or expense-report purposes.

30 The legal documents include documents such as wills, insurance policies and contracts.

 The data farm #_140 stores the documents in electronic text form (typically when the document was created electronically as in a word processor) or in a digital-image

PROTOCOLS

The protocols enabling the invention are more fully described below.

5 - Primary-Channel Priority

As illustrated in **Figure #_1**, the TC #_1261 receives input from three sources: the customer, the merchant data center #_127 (via the communications links #_128, #_1263) and the data farm #_140 (over the internet #_180). As information critical to the transaction (for example, instructions to go into electronic-signature-capture mode) flows over the link #_1263, that link #_1263 between the merchant and the TC #_1261 is herein termed the “primary channel.”

As bandwidth necessary on the primary channel to carry the expected command instructions is very low, the primary channel is preferably a low-cost, low-speed channel such as RS-232 or RS-485.

15 The second channel connected to the TC, the internet #_180, carries customer-targeted information secondary to the transaction (insurance claims, loyalty-program details, new credit-card-account offers, for example) and returns customer-supplied information (for example, survey responses, coupon selections and menu choices). As this information is secondary to the transaction, this channel is herein termed the “secondary channel.”

The second channel provides a high bandwidth in order to carry the expected graphics- and/or audio-intensive web information.

As described above, the TC #_1261 displays information from both the primary and secondary channels simultaneously to the customer. In one embodiment, the (second) area of the TC display used for displaying secondary (customer-targeted) information overlaps areas of the TC display used for primary (transaction-critical) information. For example, with the transaction drawing to a close, the customer needs to use the signature-capture portion of the input subsystem #_531, but the area of the TC display used for signature capture is actively being used to display an advertisement.

30 As another example, even where the first and second areas for the first and second channels do not overlap, the CPU #_511 may be so involved in the processing of information from the secondary channel, it may not respond to information available on the

primary channel in a satisfactory human-factors manner.

The issue then is one of control. The TC #_1261 is designed such that information (including instructions) received on the primary channel overrides information (again, including instructions) received on the secondary channel. Thus, the customer and
5 (perhaps more importantly) the customers in line behind the customer do not have to wait for the secondary information processing to complete before the customer completes his business at the POS site.

A real-time operating system in the TC #_1261 facilitates this primary-channel priority. When running both the low-speed primary port #_564 and the high-speed
10 secondary port #_561 from interrupts, giving the low-speed primary port #_564 a higher priority than the high-speed port #_561 enables the CPU #_511 to handle more expeditiously the transaction-critical primary-port data. Similarly, placing the low-speed primary port on interrupts while polling the high-speed secondary port enables the CPU #_511 to handle more expeditiously the primary-port data.

15 Giving a low-speed port higher priority than the high-speed port is counter to the general tenets of computer science: Usually, the better use of the CPU #_511's cycles is to handle the high-bandwidth channel before the low-bandwidth channel. More data is received per cycle, and the potential bandwidth of the high-speed channel is realized as fully as possible. The counter-intuitive approach nonetheless achieves the ends of the
20 invention.

Significant amounts of data may be available at the high-bandwidth channel, data to which the CPU #_511 cannot immediately attend. Accordingly, the communications subsystem #_560 may include a buffer #_566 associated with the high-bandwidth channel in order to capture that available data without involving a CPU #_511
25 committed to higher-priority data. Such a buffer #_566 helps to realize the high bandwidth of channel #_561.

- Electronic-Receipts (e-Receipts) Service

The electronic-receipts service described herein is a web server-based
30 application that communicates with a client using a web-directed language. Typically, the client is a web browser and the web-directed language is HTML or XML. Among the objectives of the electronic-receipts service are the delivery of the receipt to the browser

and a focus on the needs of the merchant.

The electronic-receipts service provides consumer-transaction details from a central database and presents this transaction information to the service user (typically, the consumer that performed the transaction). Transaction information may include the date and time of the transaction, as well as merchant-oriented fields, rendered signatures and line items. The gathering of information may apply to “physical” transaction occurring at a merchant location as well as to cyberspace transactions occurring at an e-commerce website.

When fully deployed as envisioned, the electronic-receipts service has many users, sites and transactions.

-- Roles

The electronics-receipt service establishes hierarchical roles for a user. In one embodiment, there are five (5) possible roles: service administrator, administrator-manager, administrator, guest and data.

Figure #_7 illustrates the hierarchy and relative breadth of control of each of these roles. In **Figure #_7**, a higher level has control over lower levels. For example, an administrator-manager’s control includes and exceeds any control a guest has.

The exception is that all roles — except a service administrator — are able to search for transactions.

--- Data Role

To prevent each user from having to have access to information for every table in its database, the electronic-receipts service uses the data-access roles of “system,” “data” and “administration” to facilitate a user’s access to data.

The system-data role gives access to the relational-database management system (RDMS) engine to read and initialize the current user’s system. It also allows access to update the logs.

The data role has permission to read data tables (for example, transaction, line-item and non-searchable tables).

The administration-data role has permission to read and update information related to the administration of the electronic-receipts service.

--- Guest Role

The guest role has basic access and viewing rights to the electronic-receipts service. The guest role may be used, for example, for short-term access for executives or remote support personnel.

--- Administrator Role

The administrator role has the responsibility to maintain group users and users.

--- Administrator-Manager Role

The administrator-manager has the additional responsibilities of maintaining sites and administrators and of handling exceptions. As to the last, if the electronic-receipts storage service has any exceptions, the administrator-manager handles the data corrections and provides the corrected data to the electronic-receipts storage service.

Where the administrator manager does not create administrators, the administrator manager takes on the responsibilities of those absent administrators.

--- Service-Administrator Role

An-electronic receipts-service service administrator has the most control over the electronic-receipts service. A service administrator's responsibilities include maintaining all of the role data, the field maps and administrator-managers. A service administrator's responsibilities also include setting up new site groups and search capabilities.

The administration of site groups includes adding, removing and changing a site group (including adding a field map for a site group) and adding an administrator-manager for a site group. In one embodiment, the service administrator is the only role that adds, removes or changes site groups. It is also the only role that removes sites.

-- Security

Security is a prime focus on electronic-receipts service. Most security relating to the transmitted data relies on the Secure Socket Layers Protocol, available from Netscape Communications Corporation (now a part of America Online, Dulles, VA, itself announced to merge with Time Warner of New York, NY) and well known in the art. To protect consumer information, for example, the electronic-receipts service may mask a portion(s) of a credit-card number or apply a grid over a signature. The service may restrict access to user information by requiring a password (matching the user name). Also, as described above, access to database data is restricted by role — in the manner of a need-to-know policy. Merchants can have an administrator that can give access to outside entities to their data, to payment processors, auditors credit-card companies, as a few examples.

-- Logging

The electronics-receipt service generates billing events to enable its billing system to assemble information for billing purposes. The billing system charges only once for successive views of a transaction.

A user's viewing a transaction or receipt triggers the billing event reflecting that viewing. **Figure #_8** illustrates the point at which the billing event is created in the sequence from searching for transaction details to receiving the same. The data in the billing events contain all the information needed to track and bill for the recreation of a consumer's transaction and receipt.

Figures #_9 and #_10 each show a tree of web pages for the electronic-receipts service according to one embodiment, particularly for the administration of the service. **Figure #_9** shows the site map to the electronic-receipt service. Users typically start at the Home Page and select pages as desired. **Figure #_10** shows the site map for the administrator's access to the electronic-receipts administrative functions, allowing such administrators to look up, add and delete users.

The Appendix attached hereto includes **Figures A1 - A3** as well as **Figures WP1 - WP30**. **Figures WP1 - WP30** are example web pages for the electronic-receipts service, particularly from the viewpoint of a user of the service. **Figures A1 - A3** show the relationship of the web pages of **Figures WP1 - WP16** and **WP20 - WP28** to each other.

To avoid repetition and clutter, **Figures A1 - A3** omit the menu frame at the extreme left of **Figures WP1 - WP30** after detailing each version of the menu frame when it first appears. Similarly, **Figures A1 - A3** omit the menu bar across the top of the Welcome (**Figure WP5**) and dependent web pages — after detailing the menu bar when it first appears.

- 5 Further, **Figures A1 - A3** omit self-referential links on a web page: for example, “Home” on the homepage (**Figure WP1**) and “My Personal Home Page” on the welcome web page (**Figure WP5**).

Figure WP30, WP29 and WP17 are alternate embodiments of the Receipt-Details webpage of **Figure WP8**. Likewise, **Figure WP18** is an alternate embodiment of
10 the Personal-Reminders webpage of **Figure WP14**, and **Figure WP19** an alternate of the View-New-Receipts **Figure WP7**.

The Appendix is incorporated herein by reference.

-- Adding a New Site Group

- 15 When the electronics-receipts service adds a new site group, it follows the following processes: The service administrator adds a new site group and adds a field mapping and a super-administrator manager for the site group. The administrator manager in turn adds sites and administrators for the site group. The administrator(s) add(s) users for the site group as necessary and add(s) users for each site in the site group. (Where an
20 administrator manager does not add an administrator, the administrator manager takes on the role of such an administrator.)

--- Configuring a Site

- The electronic-receipts service provides a new site with its site identification
25 (“site ID”). The new site stores its site ID into a location that the machine may use when talking to the electronic-receipts service. The site may get the site ID manually (that is to say that the administrator himself seeks the site ID from the electronic-receipts service), or the site may get the site ID automatically. In the latter case, the site accesses an electronic-receipts-service service. The machine contacts the service, gives it its site name and
30 requests a site ID. (The machine may encrypt the site ID before storing the same.)

-- The Electronic-Receipts Storage Service

The electronic-receipt storage service receives transaction information from a POS platform or bulk data transfer (i.e., batch) from a merchant and stores the

5 information in the data farm, typically in a relational-database management system (RDBMS).

The electronic-receipts service may indirectly store the information. An electronic-receipts transaction service listens for transaction messages. The transaction service disassembles the message and stores the data into a database.

10 Where there is no temporary database the data is incorporated into the permanent database. Exceptions in either processing (temporary or non-temporary) the merchant or the data farm handles automatically.

The transaction service may be a combination of two services: a temporary-database service and a permanent-database service. When the transaction service gets a
15 message, it tells the temporary-database service which then stores the data into a temporary database.

The electronic-receipts service periodically merges the temporary-database data with the real electronic-receipts-service database. This merge happens since batch processing also feeds data into the temporary-transaction database. This merge and store is
20 the function of the permanent-database service.

A site and the electronic-receipts service may communicate using messages that are name-value pairs. The following is an example of a transaction communication used to create a transaction table:

25 SiteID=981&TUID1=8171123&TUID2=0&TranType=0&PayType=1&AcctNum=4430928209&ExprDate=1999/12/02& . . .

The temporary-database service splits the name-value pairs apart and places the data into an SQL-server table.

30 The set of names for such transaction-table name-value pairs may include the following: SiteGpID (the site group ID), SiteID (the site ID), TUID1 and TUID2 (transaction unique identifiers), TranType (the transaction type), DeptID (the ID of the

department where the transaction occurred), AcctType (the account type), AcctNum (the account number), ExprDate (the expiration date of the card), AuthCode (the authorization code), AuthSrc (the ID of the authorizer), MerchID (the merchant ID), DateStmp (stamped date and time), and Customer_Signature. The set of names also includes site-defined
5 names mapped to generic fields.

Of the foregoing, the electronic-receipts service requires a site to provide the SiteID, TUID1, TUID2, TranType and AcctType pairs. The service itself provides the SiteGpID pair. The remaining pairs the site itself provides at its option.

The transaction type may be a sales, return or void. The department ID may
10 be unspecified or one of a dictionary of department IDs. The account type may include credit card, cash, debit card, check, smart card or unspecified. The account number is the number of the customer's payment card, checking account, proprietary card, etc. The ID of the Authorizer is, for example, NPC, FirstData or unspecified.

The service maintains a table of line items. The set of names for line-item-
15 table name-value pairs may include the following: TUID1, TUID2, LineNum (the line number for each item in a transaction), Descr (the description of the item), SKU (stock keeping unit), UPC (the Universal Product Code for the item) and DeptID.

Of the foregoing, the electronic-receipts service requires a site to provide the TUID1, TUID2 and Descr pairs. The service itself generates the LineNum pair. The
20 remaining pairs the site itself provides at its option.

The permanent-database service periodically looks at the temporary-database data and merges the information into the electronic-receipts service permanent database. It may add to the data (for example, SiteGpID) and split the data as necessary (customer payment information, for example). It also processes exceptions by logging all
25 bad data with a comment for handling at a later time.

The permanent-database service may back up and then lock the temporary database. The permanent-database service reads the first record and validates field names. (Of course, the INSERT() function for the permanent database typically performs its own field validation.) The service uses the SiteID to find the SiteGpID. The service splits data
30 apart and inserts a transaction record, creating an exception record as necessary. A payment record is inserted, again with an exception record created as necessary. The service updates the log for the billing system.

If the table is not locked, the record is deleted and the service moves on to the next record. If the table is locked, the service clears the table at the end of the merge.

In an alternative embodiment, the permanent-database service again backs up and then locks the temporary database. The service uses the SiteID to find the

- 5 SiteGpID. The service splits data apart (Trans and Payment). The service runs an INSERT() or BATCH_MERGE() against the temporary table into the split-data tables, with exceptions recorded as necessary. The temporary table is then cleared. This alternative embodiment has the advantage of speed.

10 **-- The Electronic-Receipts Search Service**

The search service allows an electronic-receipts-service user to search the electronic receipts data base. The search service handles presentations to the user. Broadly speaking, the search service involves all that the user sees and interacts with.

- 15 A user logs in before using the electronics-receipt service. This allows the electronics-receipt service to authorize, authenticate and validate the user. Once logged in, the service determines the user's role and routes the user routed to the appropriate pages.

-Electronic Advertising and Market Research

- 20 The TC #_200, #_300 displays graphical content (including targeted advertising) to customers. This may include dynamic offers for goods that a consumer may purchase and have shipped to his home. The data farm #_140's access to purchasing data by line item or demographics enables the farm #_140 to target content to a particular consumer.

- 25 The TC #_200, #_300 engages the customer to extract information such as customer-survey responses.

- 30 At the other end, namely, at the computer #_190, the electronic-receipts or secure internet-vault services may display content (including graphics and targeted advertising) to the consumer. A service may target the content based upon the consumer's demographics, stated preferences, purchasing history or inventory of documents in the secure internet vault, based upon any method for determining that particular information is more likely to be relevant to the consumer than other information or based upon consumer-ignorant methods, including random selection.

code scanner (not shown) in the POS system #_126, for example. The “cash-register” portion #_1262 enters the UPC information of the item into its RAM. As before, the customer is buying a personal portable Walkman (tm)-type stereo.

5 With each item identified, the POS system #_126 and the merchant data center #_127 communicate over the link #_128. The “cash-register” portion #_1262 presents the item’s UPC information to the merchant data center #_127.

The merchant data center #_127 responds with the item’s description and price. The POS system #_126 shows the item description and price to the customer, possibly along with a running sum of items identified so far, a running tax amount, etc, in a first area of its display. This first area is typically the display of the “cash-register” portion #_1262.

The merchant data center #_127 and the data farm #_140 communicate as the items are identified. The data center #_127 forwards the UPC product information over the internet #_180 (or other communications link) to the data farm #_140. The farm #_140 determines what content graphics to show the customer buying the item with the received UPC product information (and buying any other items associated with this transaction).

The data farm #_140 communicates with the TC #_1261 as the items are identified. The TC-data farm communications use the internet #_180. The farm #_140 relays to the TC #_1261 the content it determined to show the customer.

20 With the customer expected to be at the POS system #_126 for 90 seconds, the data center #_140 forwards to the TC #_1261 a multiplicity of distinct content graphics, say, a coupon for the personal portable stereo and a coupon for batteries for the portable stereo. The data farm #_140 presents these to the TC #_1261 in HTML and/or Java (tm) (that is to say, some predetermined web-directed language(s)), and the TC #_1261 converts the HTML/Java (tm) instructions into a (multi-)media presentation for the customer on a second area of the display. This second area is typically the display #_220 of the transaction computer.

The data farm #_140 may divide this second area so that multiple contents are visible to the customer simultaneously. An acceptable way of implementing these multiple sub-divisions is using frames, as is known in the web-browser art. Indeed, one frame may present content that the non-web-enabled “cash-register” portion #_1262 of the POS system #_126 forwards while another frame may present content that the web-enabled

TC #_1261 forwards.

In one embodiment, the multiple content graphics are all presented substantially simultaneously to the customer. In another embodiment, subsets of the multiple content graphics are presented over time. (The POS system shows each subset for a predetermined period of time.) In the degenerate case, the subsets consists of exactly one content graphics, and the multiplicity of content graphics is presented serially.

The data farm #_140 may form an expectation for the amount of time the customer will spend at the iPOS platform and develop a multiplicity of content graphics accordingly. However, the data farm #_140 typically will not know the actual amount of time beforehand. It may be shorter than the expected 90 seconds. In this situation, the TC #_1261 may not have enough time to present all of the multiplicity of content graphics received from the data farm #_140.

On the other hand, the customer may spend longer than the expected 90 seconds at the POS system #_126. In this situation, the TC #_1261 may have more time than necessary to present to the customer all of the multiplicity of content graphics received from the data farm #_140. The TC #_1261 may re-present some or even all of the multiplicity of content graphics.

The information that the data farm #_140 directs the TC #_1261 to present may be only visual information, only audio information, or a combination of visual and audio information. Indeed, in one embodiment, the data farm #_140 views the TC #_1261 as a fully capable web browser and directs the TC #_1261 as any web content provider would direct a web browser. (A particularly useful piece of content is an attention-grabbing burst of sound -- possibly with an animated visual -- that draws the customer's eyes to the display of the TC #_1261.)

By an express communication or by the lack of any appropriate communication, the TC #_1261 informs the data farm #_140 that the user has not responded to any of the content received from the farm #_140 and that the transaction is continuing (that is to say, the user is still at the POS system #_126). The data farm #_140 then determines that the next content to forward to the TC #_1261 is, say, a survey question or a series of survey questions from the merchant #_120 or from the manufacturer #_130 regarding consumer electronics. (The farm #_140 has previously received the survey from the manufacturer #_130, possibly over the internet #_180, or gets it as it needs it from the

manufacturer #_130 or other participant #_1A0 over the internet #_180.) The farm forwards the survey in the web-directed language to the TC #_1261.

The TC converts the instructions from the farm #_140 into a presentation for the customer. Disinclined to accept coupons but inclined to complete surveys, the
5 hypothetical customer uses, say, the touch screen portion #_531 of the TC input subsystem #_530 to complete the survey question(s).

As the survey is being completed or after the customer indicates that the survey question(s) has (have) been completed (or possibly both), the TC #_1261 communicates to the data farm #_140 the consumer's response to the survey results. The
10 farm #_140 may alter any subsequent presentation of graphics content to conform with the response it received.

For example, the customer may have indicated on the survey that he is interested in new personal-stereo technologies. The data farm #_140 forwards to the TC #_1261 an advertisement for an MP3 player and for a DAT player. The TC #_1261
15 displays these advertisements in the second area #_220 of its display.

All the while, the sales agent continues to identify items for purchase into the system #_100. Where, for example, the agent identifies a large pack of batteries subsequent to identifying the personal stereo, the data farm #_140 may determine that content regarding a coupon for batteries is inappropriate. The farm #_140 then re-instructs
20 the TC #_1261 not to display the content for batteries previously forwarded.

The graphics content encourage the customer to select the coupon by touching an area of the screen of the TC #_1261 (or otherwise indicate consent).

After the sales agent has identified all of the items that the customer selected and the POS system #_126 has displayed the transaction summary, including a total, the
25 customer presents a form of payment. Where the payment is a credit card, the customer swipes the card through the transaction computer and signs electronically, allowing the TC to capture his signature. The POS system #_126 forwards the captured electronic signature to any of the merchant data center #_120, the optional partner data center #_130, the data farm #_140 and participants #_1A0, directly or through forwarding.

Where the customer presents an electronic-funds-transfer card for payment,
30 he swipes the card through the TC of the POS system #_126 and enters his validating PIN number.

After the form of payment has been accepted, the POS system asks the customer whether he would like a printed receipt, informing the customer that the merchant #_120 will maintain an electronic receipt available to the customer at all times, regardless of the customer's preference for a printed receipt.

5 Later, while using the computer #_190, the consumer may visit a website enabling him to retrieve, view, verify and correct his transactions (physical or virtual). The consumer may access the receipt for the above transaction in order to initiate a charge dispute, download it into a personal finance application, return an item, report taxes, etc. The consumer's choice of websites includes the website of the merchant #_120 and the
10 website of the electronic-receipts service.

 The website of the merchant #_120 is "hot linked" to that of the electronic-receipts service: Clicking on a link (or entering the URL) for the merchant #_120's electronic-receipts service sends the consumer onto the website of the electronic-receipts service of the data farm #_140. Some information as to how the consumer came to be on
15 the electronic-receipts service website comes along with the consumer. (Alternatively, the merchant website may provide forms for the consumer to complete and submit the forms for the electronic-receipt service to process and provide a response, unbeknownst to the consumer.)

 One piece of that information is the identity of the merchant from whose
20 website the consumer came. The electronic-receipts service uses this merchant-identity information to limit the activities of the consumer to activities related to the identified merchant -- or, at the least, to activities not related to competitors. For example, the consumer may view receipts of his transactions with the identified merchant, may get refunds from the identified merchant, may re-order items from the identified merchant and
25 may order parts or accessories for a selected item, but the consumer may not view receipts of transactions with merchants in competition with the identified merchant, cannot get refunds from these competitors and cannot re-order items from these competitors. Similarly, the consumer may see advertisements from the identified merchant but does not see advertisements for competitors of the identified merchant.

30 When the consumer comes directly to the website of the electronic-receipts service, that is to say, without arriving via a hot link, his activities are not so restricted. He may, for example, see information about (including receipts for) all of his transactions.

These transactions may include transactions from a merchant A and any number of merchant A's competitors. Likewise, advertising directed to the consumer may include advertising from a merchant A and advertising from a competitor of merchant A.

The consumer optionally directs the translation of the transaction data into a format for personal-finance or spreadsheet software on his personal computer #_190 and downloads the transaction data onto the computer #_190. The consumer thus saves time in tracking his personal spending or in creating expense reports. (Quicken®, Microsoft Money® and Excel® are examples of personal finance and spreadsheet applications.)

While the above description of the electronic-receipts service is more from the consumer's point of view than the merchant's, a routine practitioner in the art will readily realize the invention's applications in the merchant's environment. For example, the electronics-receipt service provides benefits for the merchant as well. The service provides storage and administration of (all of the merchant's) transaction data, which data the merchant can access for its use when needed. By offering the data to the consumer, the service relieves the merchant of many customer-service tasks that it would normally need to provide.

As illustrated, the service provides the merchant an opportunity to re-market goods and services to the consumer in a very targeted manner as he accesses transaction from activities on the merchant or service's site. The merchant may sell complimentary goods and services like warranty extensions and maintenance plans.

Indeed, the invention now being fully described, many changes and modifications that can be made thereto without departing from the spirit or scope of the appended claims will be apparent to one of ordinary skill in the art.

This specification incorporates by reference all publications and patent applications mentioned herein, to the same extent if the specification had specifically and individually incorporated by reference each such individual publication or patent application.